

# Two new species of *Schusteria* (Acari: Oribatida: Ameronothroidea) from marine shores in southern Africa

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Oribatid mites are typically terrestrial, though many species of Ameronothroidea are marine intertidal. Marine ameronothroids are cosmopolitan with genera being endemic to the Holarctic, sub-Antarctic, or equatorial Indo-Pacific and tropical Atlantic regions. Recent collections from rocky-shores and mangroves of the subtropical east coast of southern Africa (South Africa and Mozambique) contained specimens of the hitherto monospecific genus, *Schusteria* Grandjean, 1968, one of ten genera from four families of marine ameronothroid. This article describes two new *Schusteria* species, *S. ugraseni* n.sp and *S. melanomerus* n.sp., and compares them with the known species, *S. littorea* Grandjean, 1968.

**Key words:** Ameronothroidea, marine mites, Oribatida, *Schusteria*, taxonomy.

## INTRODUCTION

The Ameronothroidea is unusual among the Oribatida in the diversity of habitats and geographical regions occupied by its representative species. Whereas oribatid mites are generally terrestrial and predominantly soil (litter)-dwelling, ameronothroid mites are found in extreme terrestrial and aquatic systems in Antarctica, and ephemeral freshwater pools and semiaquatic habitats in southern Africa, north America and Australia (Engelbrecht 1975; Wallwork 1981; Behan-Pelletier 1997; Norton *et al.* 1997). They are the only Oribatida to have successfully colonized and diversified in marine environments. The ten genera (from four families) of marine ameronothroid mite are endemic to the Holarctic, the sub-Antarctic, or the equatorial Indo-Pacific and tropical Atlantic regions (Luxton 1967; Schulte 1975).

The southern African shores are known to support numerous prostigmatid (Halacaridae) and astigmatid mite species (Hyadesiidae) (Bartsch 1972, 1974, 1987, 1992; Marshall & Nunkumar 1999; Marshall & Ugraseni 2000). However only a single ameronothroid mite record exists, that of *Ameronothrus bilineatus* Michael, from the Kowie estuary (near Port Alfred, eastern Cape) (Weigmann 1975). This species has an otherwise northern hemisphere distribution, suggesting

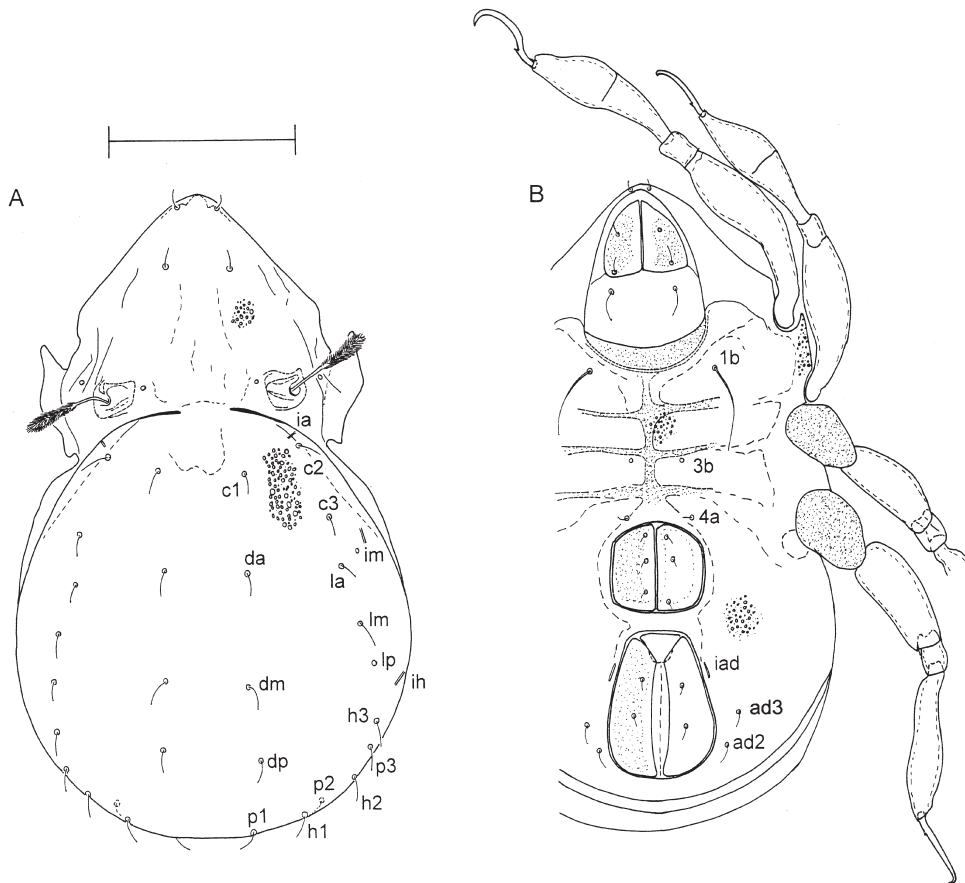
that it was probably introduced. A recent survey of the southern African coastline (from Elandsbaai, west coast, to Inhambane, Mozambique) showed the occurrence of ameronothroid mites in the warm subtropical eastern region, but not in the temperate southern/southwestern region (D.J.M., pers. obs.).

This study describes two new species of the genus *Schusteria* Grandjean, 1968, one collected from mangroves at Barra Reef, near Inhambane, Mozambique, and the other from the rocky-shore at Park Rynie, KwaZulu-Natal, South Africa. Until now only a single *Schusteria* species, *S. littorea* Grandjean, 1968 (from São Paulo, Brazil), has been described, though other undescribed species are reported from Brazil and from mangrove habitats in Pacific El Salvador (Grandjean 1968). The idiosomal and leg characteristics of the adults are the focus of the study, as details of leg setation, genitalia, gnathosoma and juvenile stages of the genus are given in Grandjean (1968).

## MATERIALS & METHODS

Specimens of *Schusteria ugraseni* n.sp. were collected by K. Ugraseni, August 1999, from empty barnacle and oyster shells in the barnacle zone of the rocky-shore at Park Rynie, KwaZulu-Natal (30°21'S, 30°43'E), South Africa. Specimens of *S. melanomerus* n.sp. were collected by D.J. Marshall, December 1997, from pneumatophores and stems of *Avicennia* mangroves at Barra reef,

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**Fig. 1.** *Schusteria ugraseni* n.sp. female. **A**, dorsal and **B**, ventral view (setae 3b broken; leg setae not drawn). Scale bar = 100  $\mu$ m.

near Inhambane, Mozambique (23°47'S, 35°22'E). All mites were preserved in 70 % ethanol and subsequently cleared in lactic acid. Descriptions are based on glycerine-mounted specimens. Chaetotaxy of the notogaster follows the unidificience nomenclature, to conform with that of the genus description (Grandjean 1968). Holotypes of both species will be deposited in the National Museum, Bloemfontein, South Africa.

## DESCRIPTIONS

### *Schusteria ugraseni* n.sp., Figs 1, 2

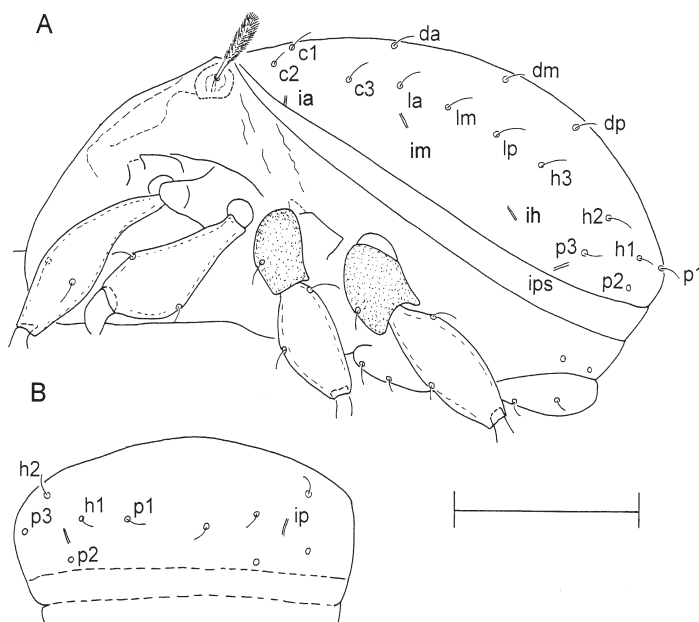
Two females and two juveniles were collected, but only the adults are described here. Idiosomal lengths 331 and 334  $\mu$ m, widths 205 and 220  $\mu$ m. Idiosoma of preserved specimens brown, legs light pinkish brown. Cuticle of entire prodorsum, dorsum and venter, sculptured with foveate orna-

mentation (*sensu* Evans 1992): the larger depressions in the cuticle c. 4  $\mu$ m in diameter.

**Prodorsum.** Rostral, lamellar and interlamellar setae short and smooth. Exobothridial seta observed as vestigial alveolus. Interlamellar ridges indistinct. Bothridium rectangular at prodorsal surface. Sensillus with long stem, capitulum clavate and barbed. Pedotectum I present, directed anteriorly.

**Notogaster.** Dorsosejugal suture incomplete. Fifteen pairs of short, smooth setae (less than 20  $\mu$ m long). Five pairs of lateral lyrifissures *ia*, *im*, *ih*, *ip*, *ips*. Lyrifissures *ia* and *ip* dorsoventrally orientated, whereas *im*, *ih* and *ips* tend towards longitudinal orientation. The opening of the opithosomal gland is adjacent to lyrifissure *im*. Seta *c1* posterior of *c2* and lyrifissure *ia*. Seta *c3* closer to *c1* than to *c2*, and closer to *im* than to *ia*.

**Venter.** Genital and anal plates darker than ventral surface and epimeral plates. Epimeral



**Fig. 2.** *Schusteria ugraseni* n.sp. female. **A**, lateral view and **B**, posterior view. Scale bar = 100 µm.

setation: 1-0-1-1; seta *1b* much longer than *3b* and *4a*. Genital plates large (each  $57 \times 28 \mu\text{m}$ ) in relation to body size. Three pairs of genital setae. Aggenital setae absent. Anal plates large (each  $81 \times 30 \mu\text{m}$ ). Two pairs of anal setae, two pairs of adanal setae (*ad2* and *ad3*) (see Grandjean 1968). Lyrifissure *iad* orientated parallel to long axis of genital plate, positioned transverse to anterior genital seta and anterior of *ad3*.

**Legs.** Most leg segments elongated and lightly sclerotized (having a pinkish hue) except trochanters III and IV which are heavily sclerotized. Lengths of femur, tibia, tarsus and claw (in µm): leg I, 83, 42, 48, 40; leg II, 81, 40, 38, 40; leg III, 65, 40, 32, 40; leg IV, 61, 51, 40, 42. Setation and solenidial formula similar to *S. littorea* (Grandjean 1968), except famulus (ε) on tarsus I which is slightly larger and tapering, and solenidium ω1 which is shorter. All legs monodactyl, claws with a basal spine on the concave face.

### ***Schusteria melanomerus* n.sp., Fig. 3**

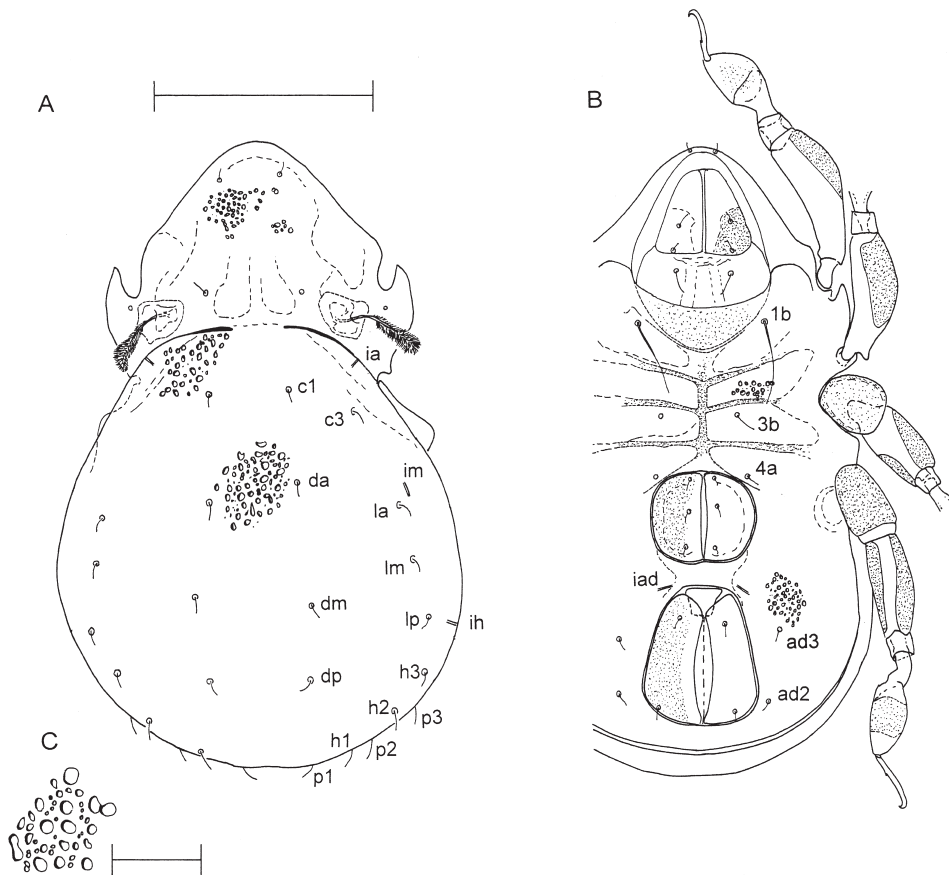
Four females examined. Idiosoma 275–294 µm long and 188–200 µm wide. Small, dark, brown idiosoma and short, dark, brown legs. Entire idiosoma (prodorsum, dorsum and venter) heavily sculptured with a foveate pattern: depressions larger and more dense than those of *S. ugraseni*.

**Prodorsum.** Rostral, lamellar and interlamellar setae short and smooth. Exobothridial seta only observed as vestigial alveolus. Interlamellar ridges indistinct. Bothridium rectangular at prodorsal surface. Sensillar stem relatively long, capitulum clavate and barbed. Pedotectum I directed anteriorly.

**Notogaster.** Dorsosejugal suture incomplete. Fourteen pairs of short setae (*c2* apparently absent). Three pairs of lateral lyrifissures observed *ia*, *im*, *ih* (*ip*, *ips* obscured by the heavily ornamented surface). Lyrifissures *ia* and *ih* dorsoventrally orientated, *im* longitudinally orientated. Seta *c1* posterior of lyrifissure *ia*. Opening of the opithosomal gland obscured.

**Venter.** Genital and anal plates darker than ventral surface and epimeral plates. Epimeral setation: 1-0-1-1; seta *1b* much longer than *3b* and *4a*. Genital plates 42 µm long, 22 µm wide. Three pairs of genital setae. Aggenital setae absent. Anal plates  $59 \times 24 \mu\text{m}$ . Two pairs of widely separated anal setae, one near posterior margin of anal plate. Two pairs of widely separated adanal setae (*ad2* and *ad3*), seta *ad3* inserted mid-level of anal plate. Lyrifissure *iad* positioned adjacent to anterolateral margin of genital plate and directed obliquely.

**Legs.** Legs relatively short. The dorsal and lateral surfaces of femora I–IV and trochanters III and IV heavily pigmented (appearing dark brown) and with punctate ornamentation. Femur II with



**Fig. 3.** *Schusteria melanomerus* n.sp. female. **A**, dorsal (opisthosomal gland opening obscured by ornamentation; leg setae not drawn) and **B**, ventral view. Scale bar = 100  $\mu$ m. **C**, enlargement of notogastral surface to show ornamentation. Scale bar = 40  $\mu$ m.

conspicuous proximodorsal projection. Lengths of femur, tibia, tarsus and claw (in  $\mu$ m): leg I, 171, 30, 32, 24; leg II, 61, 28, 30, 24; leg III, 44, 28, 30, 26; leg IV, 48, 28, 30, 26. Setation and solenidial formula similar to those for *S. littorea* (Grandjean 1968). All legs monodactyl, claws with a basal spine on concave face.

### COMMENTS

*Schusteria* belongs to the Selenoribatidae, a family currently comprising five genera, including *Selenoribates* Strenzke, 1961, *Thalassozetes* Schuster, 1963, *Psednobates* Luxton, 1992, *Arotrobates* Luxton, 1992 (Luxton 1992). The diagnostic characters of the Selenoribatidae as listed by Luxton (1992) include: 1) epimeral setation deficient (1-0-1-1), comprising only 1b, 3b and 4a; 2) adanal lyrifissure (*iad*) anterior of (or parallel to) adanal seta (*ad3*); 3) three pairs of genital setae; and 4) aggenital setae

absent. Grandjean (1968) distinguished *Schusteria* (based on *S. littorea*) from *Selenoribates* and *Thalassozetes* by the following idiosomal characters: 1) prodorsum without lamellae or costulae; 2) dorsosejugal suture incomplete; 3) sensillus with short stem, capitulum dilated and barbed; 4) ovipositor without seta *k*; and 5) lyrifissure *iad* transverse. Balogh & Balogh (1990) mention, in addition, the following distinguishing characters for *Schusteria*: 1) prodorsal setae short and simple; 2) 15 pairs of notogastral setae; 3) one pair of anal setae; 4) three pairs of adanal setae; and 5) genital and anal plates large, spanning the length of the ventral plate.

The southern African *Schusteria* species collectively share all the familial and many of the generic characters listed above. They also share with *S. littorea* a basal spine on the claw of the monodactyl legs. However, they differ from *S. littorea* in the

following characters (which should be included in future generic diagnoses): 1) foveate ornamentation of entire idiosoma; 2) sensillus with relatively long stem and capitulum elongated; 3) lyrifissure *iad* directed longitudinally in *S. ugraseni* and obliquely in *S. melanomerus*; 4) presence of 14 (not 15) pairs of notogastral setae in *S. melanomerus* (seta *c2* missing); 5) presence of two (not one) pairs of anal setae; and 6) two (not three) pairs of adanal setae.

The following characters distinguish *S. ugraseni* from *S. melanomerus* (comparisons in brackets relate to *S. melanomerus*): 1) idiosoma, genital and anal plates relatively large; 2) integument relatively lightly ornamented; 3) presence of seta *c2*; 4) dorsal lyrifissure orientated longitudinally (transversely); 5) anal setae not widely separated, posterior anal seta near middle of plate (posterior anal seta at posterior margin of plate); 6) lyrifissure *iad* directed longitudinally (obliquely); 7) setae *ad2* and *ad3* slightly separated (widely separated); 8) leg segments and claws relatively long; 9) legs lightly pigmented and smooth, excepting trochanters III and IV (trochanters III and IV and all femora, darkly-pigmented and well-ornamented); and 10) proximodorsal projection on femur II not present.

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